UFH Hand-Held Ultrasonic Flowmeter

Features

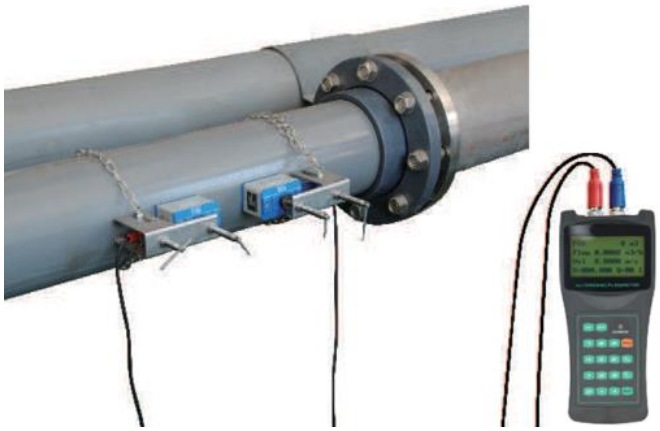
- High accuracy < 1%
- DN 15 – DN 6000 mm measurement range
- High-capacity battery (more than 10-hour operation)
- Non-invasive measurement using clamp-on sensors
- Internal memory with 2000 records
- Multi-functional display indicating flow velocity, instantaneous flow rate, flow volume and operating conditions
- Lightweight compact model

Introduction

The UFH Hand-Held Ultrasonic Flowmeter has been designed for high accurate measurements of liquid flow in the piping and closed pipe-line sections. As this flowmeter is used with clamp-on sensors, it is not necessary to impair the pipe-line.

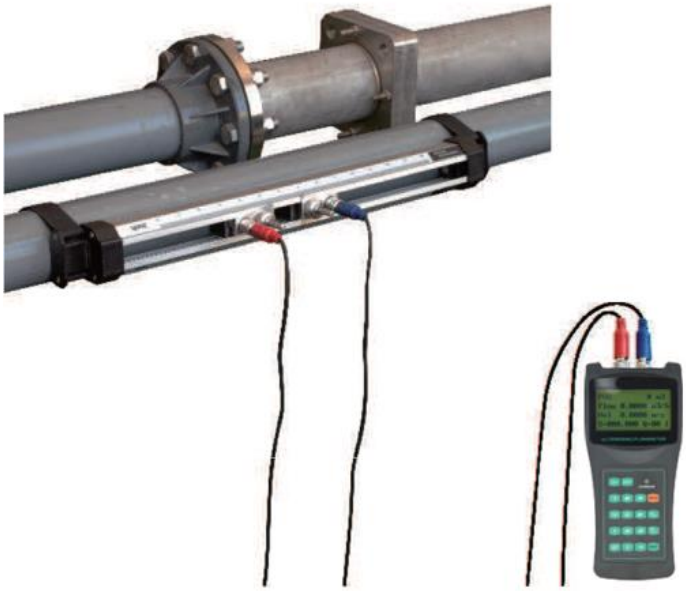
By using the microprocessor system and ultrasonic technology with high accurate measurement of transit time it is possible to measure on DN15 to DN 6000 pipes, depending on the type of sensor. The pipes can be made of any material. However, the material has to be homogeneous to transfer sound. Measurements on the piplines with lining can be made as well.

Separate clamp-on sensors



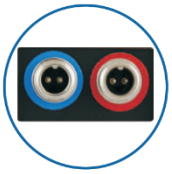
- DN 15 – DN 6000 measurement range
- Easy mounting without impairing a pipe. Zero pressure loss.
- Operating temperature up to -30 … 160 °C

Clamp-on sensor with mounting rail



- DN15–DN 700 measurement range
- Easy mounting without impairing a pipe. Zero pressure loss.
- Operating temperature up to -30 … 160 °C
- Shorter mounting time, more accurate setting of sensor distance

Main components



Sensor connector

Communication port

Also for charging the battery and reading the internal memory.

LCD display

4x 16 characters high contrast optional screen lay-outs

Rugged case

Easy to carry
Dust-water-crash resistant

Measuring principle

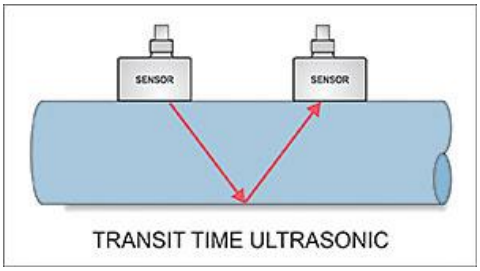
Ultrasonic flowmeters measure the difference in the transit time of ultrasonic pulses that spread upstream and downstream. This time difference is proportional to average flow velocity along the ultrasonic signal trajectory. Using the absolute transit time it is possible to

calculate average fluid velocity and sound velocity. Two transit periods t_{up} and t_{down}, the distance between the **L** sensors (transmitter and receiver) and the **α** angle make it possible to write the following equations:

$$v = \frac{L}{2\cos(\alpha)} \frac{t_{up} - t_{down}}{t_{up}\, t_{down}}$$

$$c = \frac{L}{2} \frac{t_{up} + t_{down}}{t_{up}\, t_{down}}$$

v = average flow velocity, **c** =sound velocity



Applications

Water supply	Heating plants	Buildings	Industry	Petrochemistry
				

Types of sensors

Type	Fig.	Model	Measurement range	Temperature	Dimensions
Standard separate clamp-on sensors		S2	DN15 ~ DN100	-30 ~ 90°C	45x25x32mm
		M2	DN50 ~ DN700	-30 ~ 90°C	64x39x44 mm
		L2	DN300~DN6000	-30 ~ 90°C	97x54x53 mm
Separate clamp-on sensors for high-temperature applications		S2H	DN15 ~ DN100	-30 ~ 160°C	45x25x32mm
		M2H	DN50 ~ DN700	-30 ~ 160°C	64x39x44 mm
		L2H	DN300~DN6000	-30 ~ 160°C	97x54x53 mm
Standard compact sensors		S2B	DN15 ~ DN100	-30 ~ 90°C	318x59x85 mm
		M2B	DN50 ~ DN300	-30 ~ 90°C	568x59x85 mm
		L2B	DN300 ~ DN700	-30 ~ 90°C	188x59x49 mm
Compact sensors for high-temperature applications		S2BH	DN15 ~ DN100	-30 ~ 160°C	318x59x110 mm
		M2BH	DN50 ~ DN300	-30 ~ 160°C	568x59x110 mm
		L2BH	DN300 ~ DN700	-30 ~ 160°C	188×59×49 mm

Specification

Sensor	Principle	Ultrasonic – transit time measurement, 4-bit IEEE754 arithmetic with floating decimal point
	Accuracy	Less than 1% of the instantaneous flow rate
	Display	Multilingual LCD
	Output	OCT (open collector), adjustable pulse output (6-1000 ms, 200 ms default setting)
	Communication	Isolated RS-232 port, PC connectivity, upgraded SW
Piping	Materials	Steel, stainless steel, cast iron, copper, PVC, Al, FRP etc. Lining on request.
	Diameter	15 to 6000 mm
	Straight run	10D in front and 5D behind, 30D behind the pump (D=pipe diameter)
Liquid	Type	Water, beer, sea water, acids, lyes, oil, alcohol… Liquids have to transfer sound.
	Temperature	from -30°C to + 160°C
	Velocity	+/- 12 m/s
Operating conditions	Temperature	-20°C to +60°C (converter), -30°C to +160°C (sensors)
	Humidity	Up to 85% rel. (converter), IP 67 (sensor)
Power supply	3x internal AAA batteries, 1.2V NiMH, 2000 mAh, up to 12-hour operation. External 230 VAC	
Power consumption	1.5 W	
Case	Fire-resistant ABS	
Weight	515 g (converter), sensors according to configurations	

Purchase order

UFH – (type of sensor) – cable length (5 or 10 m)

Example: UFH – S2, M2BH – 5 (UFH flowmeter with S2 and M2BH sensors incl. 5 m cable)